

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-60

Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

CATERPILLAR, INC.

Pursuant to the authority vested in the Air Resources Board by Sections 43000.5, 43013 and 43018 of the Health and Safety Code; and,

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That the following Caterpillar, Inc. 1998 model-year engine, with rated power between 175 and 750 horsepower, and exhaust emission control systems are certified as described below for use in heavy-duty off-road equipment:

Typical Equipment Usage: Industrial Equipment

Fuel Type: Diesel

<u>Engine Family</u>	<u>Liters</u>	<u>(Cubic Inches)</u>	<u>Exhaust Emission Control Systems and Special Features</u>
WCPXL10.4MRA	10.4	(636)	Turbocharger Smoke Puff Limiter

Engine models and codes are listed on attachments. Production engines shall be in all material respects the same as those for which certification is granted.

The total hydrocarbons (THC), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matters (PM) certification exhaust emission standards, in grams per brake horsepower-hour (g/bhp-hr), and the opacity of smoke emission standards, in percent (%), during acceleration (Accel), lugging (Lug), and peak (Peak) modes, for this engine family are (Title 13, California Code of Regulations, Section 2423):

<u>Exhaust Emissions (g/bhp-hp)</u>				<u>Smoke Opacity (%)</u>		
<u>THC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>
1.0	8.5	6.9	0.4	20	15	50

The THC, CO, NOx and PM exhaust emission certification values, in g/bhp-hr, and the opacity of smoke emission certification values, in percent (%), for this engine family are:

<u>Exhaust Emissions (g/bhp-hr)</u>					<u>Smoke Opacity (%)</u>		
<u>Engine Family</u>	<u>THC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>
WCPXL10.4MRA	0.4	1.3	6.2	0.3	16	12	34

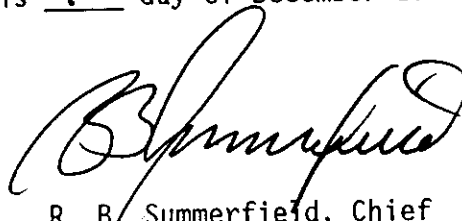
BE IT FURTHER RESOLVED: That the listed engine models comply with the "Exhaust Emission Standards and Test Procedures--Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model year.

BE IT FURTHER RESOLVED: That the listed engine models also comply with the "Emission Control Labels--1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2424) for the aforementioned model year.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the materials to demonstrate certification compliance with the Board's emission control system warranty provisions (Title 13, California Code of Regulations, Section 2425 et seq.).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

Executed at El Monte, California this 9th day of December 1997.

A large, stylized handwritten signature in black ink, appearing to read 'R. B. Summerfield', is written over the printed name and title.

R. B. Summerfield, Chief
Mobile Source Operations Division

LARGE ENGINE MODEL SUMMARY

EO: U-R-1-60

 Manufacturer: CATERPILLAR INC. Process Code: New Submission

 EPA Engine Family: WCPXL10.4MRA Manufacturer Family Name: NA

1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
Note: Peak HP 1 - Cert Engine	and Peak Torque	fuel rates are	nominal values.	Due to product-	ion engine avgs.	these fuel rates	may change.	
2	3208	260 @ 2600	89	104.3	760 @ 1560	118	82.5	EM, DI, TC, SPL
3	3208	260 @ 2600	91	106.3	734 @ 1560	116	81.1	EM, DI, TC, SPL
4	3208	250 @ 2600	88	102.2	709 @ 1560	111	77.7	EM, DI, TC, SPL
5	3208	225 @ 2600	79	92.3	654 @ 1560	101	70.6	EM, DI, TC, SPL
6	3208	210 @ 2600	74	86.3	617 @ 1560	94	65.8	EM, DI, TC, SPL
7	3208	196 @ 2600	69	80.9	578 @ 1560	87	60.9	EM, DI, TC, SPL
8	3208	175 @ 2600	63	73.2	510 @ 1560	76	53.1	EM, DI, TC, SPL
9	3208	166 @ 2600	60	70.0	482 @ 1560	72	50.1	EM, DI, TC, SPL
10	3208	250 @ 2800	88	110.9	722 @ 1680	113	84.6	EM, DI, TC, SPL
11	3208	210 @ 2800	74	92.8	608 @ 1680	91	68.9	EM, DI, TC, SPL
12	3208	175 @ 2800	63	78.8	504 @ 1680	75	56.2	EM, DI, TC, SPL
13	3208	189 @ 2500	68	75.7	557 @ 1500	84	56.5	EM, DI, TC, SPL
14	3208	220 @ 2400	79	84.7	646 @ 1440	101	65.2	EM, DI, TC, SPL
15	3208	200 @ 2400	72	81.0	618 @ 1440	96	61.7	EM, DI, TC, SPL
16	3208	190 @ 2400	69	77.3	589 @ 1440	90	58.1	EM, DI, TC, SPL
17	3208	175 @ 2400	64	68.4	505 @ 1440	76	48.8	EM, DI, TC, SPL
18	3208	150 @ 2400	56	59.8	426 @ 1440	63	40.7	EM, DI, TC, SPL
19	3208	125 @ 2400	48	51.6	368 @ 1440	54	35.1	EM, DI, TC, SPL
20	3208	165 @ 2300	61	63.0	486 @ 1380	73	44.9	EM, DI, TC, SPL
21	3208	185 @ 2200	70	68.9	574 @ 1320	89	52.6	EM, DI, TC, SPL
22	3208	175 @ 2200	66	65.3	543 @ 1320	83	49.2	EM, DI, TC, SPL
23	3208	165 @ 2200	65	61.7	512 @ 1320	77	45.7	EM, DI, TC, SPL
24	3208	160 @ 2200	61	60.1	497 @ 1320	73	43.4	EM, DI, TC, SPL
25	3208	142 @ 2200	55	53.8	441 @ 1320	64	38.0	EM, DI, TC, SPL
26	3208	150 @ 1800	65	52.6	509 @ 1320	76	45.5	EM, DI, TC, SPL